UC-19

Comparison of Active and Passive Attention Based Tasks Using EEG Waves with Convolutional Neural Network

INTRO/ABSTRACT

When considering a student's attentiveness while taking online courses, it is known that they tend to lose focus or get distracted at some point during the lecture. It is said that as humans we are supposed to learn in active environments. Watching a lecture from a screen is considered a passive task. Combining that with another factor like being tired decreases attention even more. This project compares active and passive attention trial results in two states, wide awake and tired. The data analyzed was collected from electroencephalogram (EEG) waves, and then later processed through a 3D Convolutional Neural Network (3DCNN) to produce results.

METHODS

In order to conduct our research, we used a DSI – 24 EEG headset to collect data and a 3DCNN to process the data. To begin, we conducted data collection trials. Three passive attention trials and three active attention trials were performed on seven subjects, while they were wide awake and again when they were tired. During the data collection, we also developed an adaptable 3DCNN that compared our data in order to develop our results.

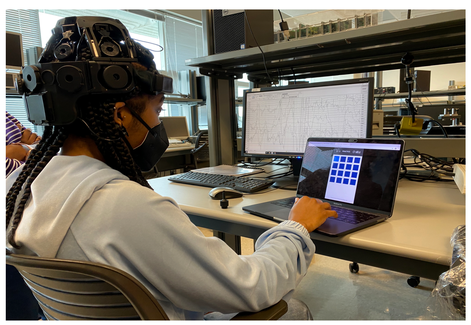

Fig. 1 – Data Collection Trial.

RESULTS

After processing our data, we were able to see a noticeable difference between passive data during both awake and tired trials. On the other hand, active data produced similar results during both types of trials. These results should encourage students to take breaks during passive tasks or even stop and return to it another day in order to produce optimal results on their studies.

References: https://wearablesensing.com/products/dsi-24/

With the help of deep learning, our project focuses on comparing active and passive attention based trials to each other. Through the analysis of data collected from electroencephalogram (EEG) waves, we have compared the similarity of the active and passive tasks taken during different states of attentiveness: wide awake and tired.

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